CLAIMS

What is claimed is:

1. A method for detecting and classifying a shape in a medical image, comprising the steps of:

(a) generating a plurality of 2-D sections through a 3-D volume in said medical image, said 3-D volume comprises said shape;

(b) performing feature estimation of said shape for each of said plurality of 2-D sections;

(c) generating a shape signature based on said estimated features; and

(d) classifying said shape signature with a classifier to classify said shape.

2. The method as set forth in claim 1, wherein said plurality of 2-D sections differ from each other in position, orientation or position and orientation.

3. The method as set forth in claim 1, wherein said plurality of 2-D sections are randomly selected.

4. The method as set forth in claim 1, wherein said plurality of 2-D sections are a plurality of triples of mutually orthogonal planes.

5. The method as set forth in claim 4, wherein said plurality of triples of mutually orthogonal planes are randomly selected.

6. The method as set forth in claim 1, wherein said feature estimation comprises the step of determining intensity features or statistics.

7. The method as set forth in claim 1, wherein said feature estimation comprises the step of fitting one or more lines, fitting one or more circles, fitting one or more ellipses, fitting one or more quadratic curves, fitting one or more rectangles, or fitting one or more parallel lines.

8. The method as set forth in claim 1, wherein said shape signature is obtained via a histogram of a plurality of shape signatures.

9. The method as set forth in claim 1, wherein said shape signature is obtained via vector quantization.

10. The method as set forth in claim 1, wherein said classifier is a support vector machines classifier.

11. The method as set forth in claim 1, wherein said classifier is optimized with training data.

12. The method as set forth in claim 1, wherein said classified shape is used as training data for said classifier.

13. The method as set forth in claim 1, wherein the step of classifying further comprises the step of distinguishing a polyp from a non-polyp.

14. The method as set forth in claim 1, wherein said shape is selected by a pre-detection of said shape.

15. The method as set forth in claim 1, wherein said medical image is obtained through computed tomography colonography.

16. A method for detecting and classifying a shape in a medical image, comprising:

(a) in a pre-processing step, detecting said shape in a 3-D volume of said medical image; and

(b) in a post-processing step, performing feature estimation of said detected shape for each of a plurality of 2-D sections defined in said volume, generating a shape signature based on said estimated features and classifying said shape signature with a classifier to classify said shape.

17. The method as set forth in claim 16, wherein said plurality of 2-D sections differ in position, orientation or position and orientation.

18. The method as set forth in claim 16, wherein said plurality of 2-D sections are randomly selected.

19. The method as set forth in claim 16, wherein said plurality of 2-D sections are a plurality of triples of mutually orthogonal planes.

20. The method as set forth in claim 19, wherein said plurality of triples of mutually orthogonal planes are randomly selected.

21. The method as set forth in claim 16, wherein said feature estimation comprises the step of determining intensity features or statistics.

22. The method as set forth in claim 16, wherein said feature estimation comprises the step of fitting one or more lines, fitting one or more circles, fitting one or more ellipses, fitting one or more quadratic curves, fitting one or more rectangles, or fitting one or more parallel lines.

23. The method as set forth in claim 16, wherein said shape signature is obtained via a histogram of a plurality of shape signatures.

24. The method as set forth in claim 16, wherein said shape signature is obtained via vector quantization.

25. The method as set forth in claim 16, wherein said classifier is a support vector machines classifier.

26. The method as set forth in claim 16, wherein said classifier is optimized with training data.

27. The method as set forth in claim 16, wherein said classified shape is used as training data for said classifier.

28. The method as set forth in claim 16, wherein the step of classifying further comprises the step of distinguishing a polyp from a non-polyp.

29. The method as set forth in claim 16, wherein said medical image is obtained through computed tomography colonography.

30. A program storage device accessible by a computer, tangible embodying a program of instructions executable by said computer to perform method steps for detection and classification of a shape in a medical image, comprising:

(a) means for generating a plurality of 2-D sections through a 3-D volume in said medical image, said 3-D volume comprises said shape;

(b) means for performing feature estimation of said shape for each of said plurality of 2-D sections;

(c) means for generating a shape signature based on said estimated features; and

(d) means for classifying said shape signature with a classifier to classify said shape.

31. The program storage device as set forth in claim 30, wherein said plurality of 2-D sections differ from each other in position, orientation or position and orientation.

32. The program storage device as set forth in claim 30, wherein said plurality of 2-D sections are randomly selected.

33. The program storage device as set forth in claim 30, wherein said plurality of 2-D sections are a plurality of triples of mutually orthogonal planes.

34. The program storage device as set forth in claim 33, wherein said plurality of triples of mutually orthogonal planes are randomly selected.

35. The program storage device as set forth in claim 30, wherein said feature estimation comprises means for determining intensity features or statistics.

36. The program storage device as set forth in claim 30, wherein said feature estimation comprises means for fitting one or more lines, fitting one or more circles, fitting one or more ellipses, fitting one or more quadratic curves, fitting one or more rectangles, or fitting one or more parallel lines.

37. The program storage device as set forth in claim 30, wherein said shape signature is obtained via a histogram of a plurality of shape signatures.

38. The program storage device as set forth in claim 30, wherein said shape signature is obtained via vector quantization.

39. The program storage device as set forth in claim 30, wherein said classifier is a support vector machines classifier.

40. The program storage device as set forth in claim 30, wherein said classifier is optimized with training data.

41. The program storage device as set forth in claim 30, wherein said classified shape is used as training data for said classifier.

42. The program storage device as set forth in claim 30, wherein said means for classifying further comprises means for distinguishing a polyp from a non-polyp.

43. The program storage device as set forth in claim 30, wherein said shape is selected by a pre-detection of said shape.

44. The program storage device as set forth in claim 30, wherein said medical image is obtained through computed tomography colonography.